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FOREST SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE
ALLEGHENY FOREST EXPERIMENT STATION*

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Technical Note No. 9.

3.35

THE DYING OF HEMLOCK AND OTHER SPECIES ON THE ALLEGHENY NATIONAL FOREST

Foresters and timberland owners have noticed with alarm the death of mature hemlock during recent years on the Allegheny National Forest and fears have been expressed for the survival of Tionesta Forest. In 1932 and again in the spring of 1935, patches of hemlock in the virgin stands near Sheffield, Pennsylvania, turned brown and died. A study of the causes for this condition was made by the Allegheny Forest Experiment Station and Mr. R. C. Lorenz of the Bureau of Plant Industry, during July, 1935. Recently dead and dying hemlock in the East Tionesta valley and the Deer Lick Run tract were examined in detail and a strip cruise made to determine the recent mortality by topographic sites.

The results indicate that drought damage has been the primary factor in the death of mature hemlock, beech, and other species. The dry period culminating in the late summer drought of 1930 weakened many trees which died during 1931 and 1932. In 1934 serious local drought occurred from May to July, and losses were noticed on a large scale during the spring and summer of 1935. The influence of drought was most severe on the ridge tops and steep upper slopes of both localities; only slight damage was recorded on the stream bottom sites. On a 53 chain cruise strip on an east facing slope in the middle of the Deer Lick Run tract, small hemlock between 2 and 10" in diameter at breast height suffered 3.0 per cent mortality on the ridge top, 3.1 per cent on the lower slope, and no mortality on the stream bottom and upper slope sites. Mature dominant hemlock lost 16.7 per cent of the total number of trees on the ridge top, 10.3 per cent on the upper slope, and 6.2 per cent on the lower slope.

A native forest insect, the Eastern hemlock borer, (Melanophila fulvoguttata Har.), was found to be a frequent associate of the drought-weakened hemlock, but, according to the Bureau of Entomology and Plant Quarantine, is of no great importance as a cause of the death of trees. It was evident that root rotting or other parasitic fungi are not primarily the cause of death but attack the weakened or dead trees as secondary enemies. The shoestring fungus Armillaria mellea was found on the roots of a few living hemlock and beech, and was present on all trees dead a year or more.

In general, there seems to be no reason to fear the wiping out of hemlock and other species that have occupied this region for thousands of years. Losses of mature slow-growing trees of poor vigor are inevitable during periods of drought, and have occurred many times in the past. Since the smaller trees show a much lower mortality than larger trees, hemlock and beech have both been able to maintain themselves in the virgin forest despite death of the overstory due to drought and other enemies. The natural control exerted by periods of abundant precipitation with increase in tree vigor, and the replacement of ageing trees with rapidly-growing younger ones, repairs the damage and guarantees the existence of a virgin forest cover in the future. Logging adjacent to virgin tracts may be expected to result

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in the death of hemlock near the cutting edge because of changed local climatic conditions and exposure. Within the interior of the large tract of old-growth hemlock and beech in the Cherry and Fork Run drainages, now in Federal ownership, excessive dying of hemlock has not occurred, and the essential composition of the major portion of this stand will not be altered except by such a catastrophe as extensive windthrow or severe fire.

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January 14, 1936.

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